

7. Throughout the entire cord up to the cervical region the columns of Goll receive their fibres from the posterior roots. In the cervical cord the posterior root fibres enter the columns of Burdach.

8. The descending system of the posterior columns consists principally of myelogenic fibres. The bundles of descending fibres in the posterior columns, described by different authors under various names, belong to one and the same system, which at different levels of the cord changes its position and form.

9. In hemi-sections of the cord degenerations of the columns of Goll, Burdach, Flechsig, Gowers and Löwenthal are observed on both sides. The decussation of the columns of Goll and Burdach, and partly of Flechsig, takes place on the posterior commissure. The fibres of Gowers' and Löwenthal's bundles cross over principally in the anterior commissure.

10. The antero-lateral (Gowers') columns in dogs extend forward as far as the anterior fissure of the cord, and partly enter the anterior columns.

11. Gowers' and Flechsig's columns must be considered as belonging, anatomically, to one and the same system. A portion of both tracts terminates unquestionably in the cerebellum in the region of the nucleus dentatus and nucleus tecti. Decussation of part of these fibres occurs, in all likelihood, in the upper cerebellar vermiform process.

12. Descending degeneration of Gowers' and Flechsig's columns appears questionable. Such described degenerations must be attributed to the fibres of Löwenthal's bundle.

13. The existence in man of a separate descending system in the antero-lateral tract may be considered as proved.

14. The descending degeneration of the intra-spinal anterior roots from the point of section may be best explained by the passage into the former of fibres from Löwenthal's bundle.

15. The ascending degeneration of the intra-spinal anterior roots is occasioned by the passage into them of the direct cerebellar and antero-lateral fibres.

16. The traumatic degeneration, in the sense of Schiefferdecker, is only observed for a space of $\frac{1}{2}$ -1 cm. above and below the section.

17. In the anterior pyramidal tracts of the human brain are fibres which degenerate upward, and which may be separated to form a distinct system (Marie).

MEIROWITZ.

PHYSIOLOGY.

60. A TENTATIVE EXPLANATION OF SOME OF THE PHENOMENA OF INHIBITION ON A HISTO-PHYSIOLOGICAL BASIS, INCLUDING A HYPOTHESIS CONCERNING THE FUNCTION OF THE PYRAMIDAL TRACTS. B. Onni (State Hospitals' Bulletin, 2, 1897, p. 45).

The author offers the following theory to account for the phenomena of inhibition of the patellar reflexes: "For the excitation of a nerve cell the movement has to pass in the direction from the cell body or its protoplasmic processes toward the nervous process; for the inhibition of the cell the nerve current has to pass in the opposite direction, that is, from the nerve process, or its collaterals, back to the cell body. In other words, to produce excitation of a given cell the nerve current must enter this cell from the surface of its cell body or of its dendrites; but in order to inhibit or moderate the action of the cell the nerve current has to enter the cell from its nerve process or collaterals thereof."

Interpreted in anatomical terms, the author suggests that in the test of the knee jerk the peripheral motor neuron is acted upon in three ways:

1. From the peripheral sensory nerve fibres, probably through a collateral thereof. (The direct reflex arc.)
2. From the cerebellum, which maintains a constant stimulation of the peripheral motor neuron, producing the necessary excitation.
3. From the cortico-spinal fibres, which have an inhibitory action, and thus counteract the other two exciting impulses. "Assuming all this to be the case, interruption of the cortico-spinal pyramidal fibres will give rise to exaggeration of the knee jerk by loss of the inhibitory influence. Interruption of the cerebello-spinal motor tract will cause absolute loss of the reflex, as the sensory stimulus coming from the tendon will be counteracted by the inhibitory action of the pyramidal fibres."

JELLIFFE.

61. LE MÉCANISME DES MOUVEMENTS REFLEXES (Mechanism of Reflex Movements). Van Gehuchten (Neurolog. Centralblatt, 10, 1897, p. 919; abst.).

The author presented this paper at the International Medical Congress of Moscow, an abstract of it appearing in the above mentioned journal.

A number of observers have shown that after complete transverse lesion of the cervical or dorsal region there is a complete loss of the tendon, skin and visceral reflexes, save perhaps the persistence of the plantar reflex upon deep needle puncture. According to our present physiological knowledge these facts are difficult of explanation.

The normal muscular tonus, according to Van Gehuchten, depends upon the condition of excitation which at any moment may be present in the cells of the anterior horns. This excitability depends upon the connecting fibres going to these cells; fibres from the posterior horns and from the cortex and cerebellum through the posterior longitudinal fasciculus.

Such fibres convey either *excitation* (posterior root fibres, intestinal and cerebellar fibres) or *impulses* (cortico-spinal fibres).

The normal muscular tone is thus dependent upon the *nervous tone* of the anterior horn cells, which is imparted to them by these two forms of stimulation, and any change in the nervous tone of these cells affects the muscle tonus. For the consummation of a voluntary movement it is not enough that the fibres from the motor zone to the muscles be intact, the cells in the anterior horns must have their normal nervous tone.

Thus a reflex motor act can occur only when:—

1. The reflex arc is both anatomically and physiologically intact.
2. When the motor cells have a normal nervous tone. Upon this second postulate depends the relationship of the intensity of the reflex act to the peripheral stimulation. Thus it is possible to understand why after the lesions of the pyramidal tracts exaggerated reflexes may be present, without the necessary theoretical assumptions of secondary degeneration or sclerosis of these fibre tracts.

Also it may be explained along some such hypothesis why reflexes may be lost after complete lesion of the cord without calling into account the nervous shock and inhibition fibres, according to Kahler and Pick, or to speak of a functional disturbance of the gray matter of the lumbo-sacral cord.

VOGEL.

62. UEBER DIE LEITUNGSBAHNEN DER REFLEXE IM RÜCKENMARK UND DEN ORT DER REFLEXÜBERTRAGUNG (On the Conduction Paths of the Reflexes in the Spinal Cord and the Locality of the Reflex-Tranier). J. Rosenthal and M. Mendelssohn (Neurolog. Centralblatt, 16, 1897, p. 21)

In contradiction of the accepted view that the short paths be-